



UNITED STATES PATENT AND TRADEMARK OFFICE

NB
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/453,772	12/03/1999	YUZURU SUZUKI	3045-2339	3036

21888 7590 11/04/2002

THOMPSON COBURN, LLP
ONE FIRSTAR PLAZA
SUITE 3500
ST LOUIS, MO 63101

EXAMINER

PEREZ, GUILLERMO

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 11/04/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/453,772

Applicant(s)

SUZUKI ET AL.

Examiner

Guillermo Perez

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 August 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu (U. S. Pat. No. 4,656,381) in view of Atsumi et al. (U. S. Pat. No. 5,113,107) and further in view of Idogaki et al. (U. S. Pat. 4,644,211).

Komatsu discloses a claw pole type actuator of a single-phase structure (figure 25), comprising:

a stator yoke composed of a pair of substantially circular planar yokes (112, 115) formed of a soft magnetic material,

a number N of polar teeth (113, 114, 116, 117) which axially protrude from inner peripheral edges of the respective planar yokes and which are disposed to face each other, extending in an axial direction, and

a cylindrical ring (112b, 115b) provided on outer peripheral edges of one of the planar yokes. Komatsu discloses an armature (120) being constituted by installing a coil (119) formed by winding a magnetic wire (118) in a coil receiving section shaped like an annular recess formed by the planar yokes, the polar teeth, and the cylindrical ring of the stator yoke. Komatsu discloses a rotor (110) being concentrically disposed within

Art Unit: 2834

the stator yoke having a number N of magnetic poles. Komatsu discloses a rotor being adapted to repetitive rotational movement within a set angular range in response to energizing of the coil.

Komatsu discloses a stator assembly which has flanges (121, 122) with bearing provided on both end surfaces of the armature and in which a rotor provided with a magnet for a magnetic field composed of a permanent magnet being installed to face the polar teeth of the stator with a minute gap provided there between. Komatsu discloses that a number of the polar teeth equals the number N of rotor magnetic poles (figure 26). Komatsu discloses that the stator yoke is comprised of a first stator yoke in which a planar yoke and a polar tooth are combined into one piece, and a second stator yoke in which a planar yoke, a polar tooth and a cylindrical ring are combined into one piece. Komatsu discloses that the polar teeth of the first and second stator yokes, respectively, are disposed at a spacing of approximately 180 degrees in terms of an electrical angle.

Komatsu discloses a pair of stator yokes, each being composed of the planar yoke and the cylindrical ring that are combined into one piece, are disposed to face each other. Komatsu discloses that the flanges are composed of a nonmagnetic material (column 11, lines 64-65).

However, Komatsu does not disclose that the angular range is less than 360 degrees and have its endpoints defined by a first angular position and a second angular position. Komatsu does not disclose that the rotor is further adapted to be held in either the first angular position or the second angular position by a detent torque when the coil

is de-energized. Komatsu does not disclose that the rotation of the rotor is restricted by a stopper so that a maximum angle of the rotational motion stays within a range of 120/N to 240/N degrees. Komatsu does not disclose that the stopper is incorporated in the actuator.

Atsumi et al. disclose a rotor (42 in figure 4) being adapted to repetitive rotational movement within a set angular range (figure 2 and column 4, lines 11-17). Atsumi et al. disclose that a rotation of the rotor (42) is restricted by a stopper (7) so that a maximum angle of the rotational motion stays within a range of 120/N to 240/N degrees (column 1, lines 9-13 and column 4, lines 12-17). Atsumi et al. disclose that the stopper (7) is incorporated in the actuator (1). The invention of Atsumi et al. has the purpose of limiting the rotation to a limited angular range in a clockwise and counterclockwise direction.

Idogaki et al. disclose that the angular range is less than 360 degrees and have its endpoints defined by a first angular position and a second angular position (column 5, line 40 through column 6, line 5; and column 9, lines 23-32). Idogaki et al. disclose that the rotor (7) is further adapted to be held in either the first angular position or the second angular position by a magnetic detent torque (column 9, lines 23-32) when the coil is de-energized (column 5, lines 20-23). Idogaki et al. disclose that the stopper (13) is incorporated in the actuator (10). The purpose being that of providing a two-position switching type of apparatus which substitute conventional electronically controlled suspensions.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of a single-phase structure of Komatsu and provide it with the rotor and stopper configuration as disclosed by Atsumi et al. and Idogaki et al. for the purpose of limiting the rotation to a limited angular range in a clockwise and counterclockwise direction; and providing a two-position switching type of apparatus which substitute conventional electronically controlled apparatuses.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to restrict the rotation of the rotor to a range of 120/N to 240/N degrees since it has been held that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. and further of Idogaki et al. as applied to claim 1 above, and of Yamaguchi et al. (U.S. Pat. No. 5,373,207).

Komatsu, Atsumi et al. and Idogaki et al. disclose a claw pole type actuator as described on item 1 above. However, neither Komatsu, Atsumi et al. nor Idogaki et al. disclose a groove or a cut for destroying magnetic balance is provided in an axial direction on a central portion of one of south pole and north pole of the magnet for magnetic field.

Yamaguchi et al. disclose a groove or a cut (figure 9) destroying magnetic balance being provided in an axial direction on a central portion of either a south pole or

north pole of the magnet. The invention of Yamaguchi et al. has the purpose of producing a vibration during the operation of the motor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu, Atsumi et al. and Idogaki et al. and provide it with the cut disclosed by Yamaguchi et al. for the purpose of producing a vibration during the operation of the motor.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. and further of Idogaki et al. as applied to claim 1 above, and of Haydon et al. (U. S. Pat. No. 4,274,026).

Komatsu, Atsumi et al. and Idogaki et al. disclose a claw pole type actuator as described on item 1 above. However, neither Komatsu, Atsumi et al. nor Idogaki et al. disclose that extensions of the two polar teeth in a circumferential direction are all the same and stay within a range of 220/N to 260/N degrees at central angle.

Haydon et al. disclose that extensions of the polar teeth in a circumferential direction are all the same and stay within a range of 220/N to 260/N degrees at central angle (figures 12-13 and column 9, lines 14-19). The invention of Haydon et al. has the purpose of improving the net usable torque of the rotor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu, Atsumi et al. and Idogaki et al. and provide it with the extensions configuration disclosed by Haydon et al. for the purpose of improving the net usable torque of the rotor.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al. and further of Idogaki et al. as applied to claim 1 above, and of Morril (U.S. Pat. No. 5,260,620).

Komatsu, Atsumi et al. and Idogaki et al. disclose a claw pole type actuator as described on item 1 above. However, neither Komatsu, Atsumi et al. nor Idogaki et al. disclose that air gaps in a radial direction formed by the polar teeth and the rotor magnet are uneven. Neither Komatsu, Atsumi et al. nor Idogaki et al. disclose that air gaps at central portions of the polar teeth are narrower than air gaps at ends of the polar teeth.

Morril discloses air gaps (figure 5) in a radial direction formed by the polar teeth (16) and the rotor magnet are uneven. Morril discloses that air gaps at central portions of the polar teeth are narrower than air gaps at ends of the polar teeth. Morril's invention has the purpose of improving torque, speed and efficiency in the motor.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu, Atsumi et al. and Idogaki et al. and provide it with the air gap configuration disclosed by Morril for the purpose of improving torque, speed and efficiency in the motor.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu in view of Atsumi et al., and further of Idogaki et al. as applied to claim 1 above, and further in view of Horst (U. S. Pat. No. 5,122,697).

Komatsu, Atsumi et al. and Idogaki et al. disclose a claw pole type actuator as described on item 1 above. However, neither Komatsu, Atsumi et al. nor Idogaki et al.

disclose that a relationship between a detent torque T_d (Nm) and a rated torque T_{rate} (Nm) is as follows:

$$T_{rate}/4 \leq T_d \leq 3 T_{rate}/4; \text{ where:}$$

T_{rate} denotes a maximum torque value obtained when a rated current is passed, and detent torque T_d denotes a maximum torque when a coil is in a de-energizing mode.

Horst discloses that a relationship between a detent torque T_d (Nm) and a rated torque T_{rate} (Nm) is as follows:

$$T_{rate}/4 \leq T_d \leq 3 T_{rate}/4$$

where T_{rate} denotes a maximum torque value obtained when a rated current is passed, and detent torque T_d denotes a maximum torque when a coil is in a de-energizing mode (figure 2 and column 5, lines 1-26). Horst's invention has the purpose of providing rotor torque when the coil-excited reluctance torque is zero or negligible.

It would have been obvious at the time the invention was made to modify the claw pole type actuator of Komatsu, Atsumi et al. and Ilogaki et al. and provide it with the torque relationship disclosed by Horst for the purpose of providing rotor torque when the coil-excited reluctance torque is zero or negligible.

Response to Arguments

Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Application/Control Number: 09/453,772
Art Unit: 2834

Page 9

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Perez whose telephone number is (703) 306-5443. The examiner can normally be reached on Monday through Thursday and alternate Fridays.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on (703) 308 1371. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3432 for regular communications and (703) 305 3432 for After Final communications.

Application/Control Number: 09/453,772

Page 10

Art Unit: 2834

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.


NESTOR RAMIREZ
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Guillermo Perez
November 1, 2002